



# ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

HOUSTON, TEXAS

VOL. 16 NO. 18

Friday, September 2, 1977

## Kleinknecht assumes new post

Kenneth S. Kleinknecht, Assistant Manager of the Orbiter Project, has accepted a new post as Deputy Administrator for Space Flight, European Operations, effective September 1. He will serve as represent-

ative for the Office of Space Flight on all matters involving direct relationships between the Associate Administrator for Space Flight and the Director General of the European Space Agency (ESA). He will also serve as a NASA Senior Consultant to ESA on Spacelab matters, interfacing with the ESA Spacelab Program Director.

Kleinknecht has a long history with NASA and with its predecessor, NACA, and he admits he has "been where the action is." His most recent assignments have included Director of Flight Operations; Manager of the Skylab Program; Manager of the Command and Service Modules, Apollo Program; Deputy Manager of the Gemini Program; and Manager of Project Mercury. He joined the Manned Spacecraft Center, as JSC was known then, in 1962.



Kenneth S. Kleinknecht

## Voyager 2 begins trek

Voyager 2, the first of two NASA scientific spacecraft designed to obtain data on the outer planets in the solar system, was launched from Kennedy Space Center Complex 41, Cape Canaveral, on Saturday, Aug. 20. Launch time was 9:29 a.m. CDT.

Early troubles encountered at

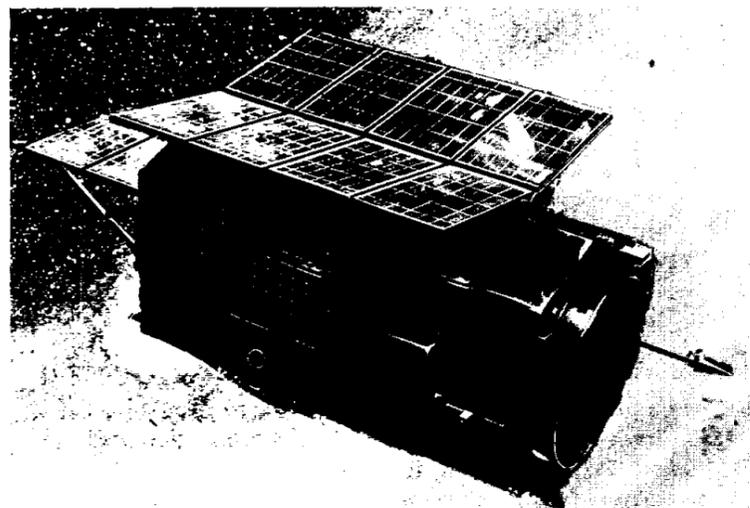
launch time appear mostly solved. One problem was the apparent failure of a boom holding the television camera and scientific instruments to deploy properly.

However, Alan Wood of NASA's Jet Propulsion Laboratory (JPL) announced that engineers "now believe it is within a very few degrees of full deployment, if not fully deployed."

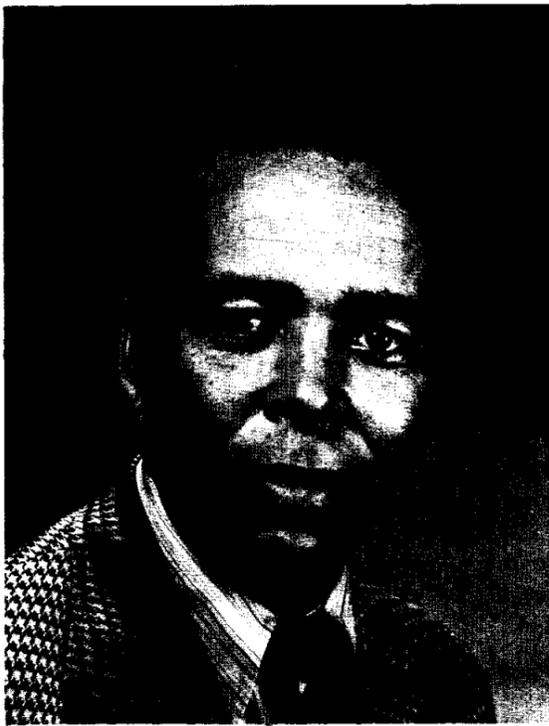
An apparently malfunctioning gyroscope turned out not to be malfunctioning at all. Rather, faulty data was being received. The attitude and articulation control processor (subsystem) includes an onboard computer called HYPACE (hybrid programmable attitude control electronics), with two redundant 4,096-word plated wire memories among many other capabilities. Some phony interpretation was being received, and the problem was traced to the onboard memory system. Experts at JPL say, however, that the problem is being worked on at this time and should not be a continuing problem if engineers there can continue their present efforts in this area.



Voyager 2 liftoff



HEAO-A ARTIST'S CONCEPT — This slowly rotating observatory will perform an all-sky survey from a lower circular Earth orbit.



Isaac T. Gillam IV



Dr. Bruce T. Lundin

## Gillam is new Dryden Deputy, LeRC Director Lundin retires

Isaac T. Gillam IV, Director of Space Shuttle Operations at the Dryden Flight Research Center is now Deputy Director of the Center. He succeeds Gerald D. Griffin, who became Deputy Director of the Kennedy Space Center in June.

Gillam came to NASA Headquarters in 1963 as a resource management specialist. In February 1966, he was appointed Assistant Delta Program Manager in the Launch Vehicles Directorate, and in September 1968 was named Delta Program Manager. He became Program Manager of Small Launch Vehicles at NASA Headquarters in 1973 and joined Dryden in May 1976. Since that time, Gillam has been responsible for the Dryden

activities in support of the Shuttle tests there.

At the Lewis Research Center, Dr. Bruce T. Lundin retired as of August 26. He was Director of the Lewis Center for nearly eight years and spent 34 years with NASA and its predecessor NACA. Work that he directed during the years just before space flight contributed significantly to the performance and reliability of today's commercial transport and supersonic aircraft jet engines.

After 1961, his responsibilities included development of turbojet engines, chemical rockets, electric thrusters for spacecraft propulsion, and electric power generation systems using chemical, solar, and nuclear energy sources.

Dr. Bernard Lubarsky, Deputy Director of Lewis, will become Acting Director until a successor to Dr. Lundin is announced.

Colorful!  
Exciting!

Hispanic Heritage Program!

Begins Sept. 16,  
1:30 p.m.

Building 2  
Auditorium

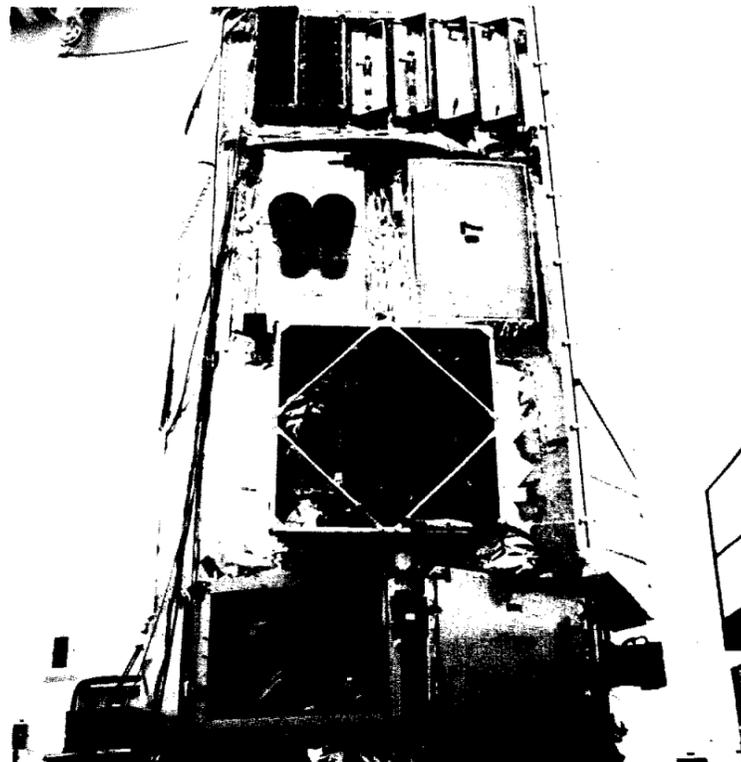
## Two satellites are launched

The launches of an orbiting astronomy observatory and an experimental Italian Communications satellite were scheduled for Aug. 12 and 17, respectively.

The launch of the High Energy Astronomy Observatory-A (HEAO-A) is the first in a series of three observatories designed to explore such intriguing mysteries as pulsars, black holes, neutron stars, and supernovae. Scientists also intend to study X-rays, gamma rays, and cosmic rays, which are emitted by stellar sources throughout the universe. Such studies will be of particular significance for astronauts and individuals who may one day live and work in space.

Launch was aboard an Atlas-Centaur rocket from Cape

(Continued on page 4)



THE REAL THING — The actual HEAO-A is shown in preparation for launch aboard an Atlas/Centaur rocket. Three such observatories are planned.



SPECIAL ACHIEVEMENT AWARD PRESENTED — Shown left to right are: Joseph G. Thibodaux, Jr., Aleck C. Bond, Aaron Cohen, Dwayne P. Weary, Dr. Christopher C. Kraft, Jr., and Dr. Maxime A. Faget.

## Weary is honored with special award

Dwayne P. Weary, Engineering and Development Subsystem manager for the Orbiter Auxiliary Power Unit (APU) received a JSC Special Achievement Award on August 1 from Dr. Christopher C. Kraft, Jr., Center Director. Through Weary's efforts, a costly shutdown due to a malfunction of one of the APU's was averted. His actions resulted in a considerable monetary savings and prevented a delay in the first manned captive active flight test. His citation reads: "For his outstanding performance in quickly resolving an anomaly in the Orbiter Auxiliary Power Unit that allowed the unit to be reserviced and the test program to proceed."



LUNAR SAMPLE PRESENTED — Ed Mason, center, a member of the Houston Section of the American Institute of Aeronautics and Astronautics (AIAA), recently delivered a lunar sample from JSC to Dr. Mark Littman, right, curator of the Hansen Planetarium in Salt Lake City. At left is R. Gilbert Moore, past chairman of the Utah Section of AIAA. The lucite-encased Moon rock will be prominently displayed in the main lobby of the planetarium along with lunar photographs and drawings.

## Flight simulations give idea for thesis

When Al Ragsdale gets his Master's Degree in Avionics Instrumentation from the University of Houston at Clear Lake City, he may hang it on the wall beside the Presidential Medal of Freedom awarded him for helping to bring the Apollo 13 astronauts safely home. It was the most perilous day of all the flights for Al, who has been at NASA ten years.

Presently, Al is working with Space Shuttle simulation and is project engineer on the Orbital Aeroflight Simulator for the Link Division of the Singer Company. His lengthy involvement with flight simulation sparked the idea for his master's thesis, "Recovering the

Space Shuttle with Conventional Navigation Aids." In it, Al describes how a pilot can determine the desired glide range versus speed using standard navigational aids and simple equations.

"What if the computer dies as the Shuttle is gliding in?" asks Ragsdale. "There should be a procedure the pilot can follow without any computer help if he is going 10,000 miles per hour during the blackout between outer space and the landing and discovers something is wrong."

Ragsdale has tested the thesis in simulation with astronauts. And he says it works!



Robert Munson

## Munson, wife, professor die in airplane crash

Robert Munson, an employee at the JSC White Sands Test Facility, along with his wife Diana, Dr. Staffeldt, a New Mexico State University professor, and Mr. Scott Levine, pilot, were killed in an airplane crash in southern New Mexico on Thursday, August 11.

At the time of the accident, they were returning from Los Alamos, New Mexico, where they had made a presentation on conversion of waste products to energy. Munson was on an intergovernmental personnel load to the NMSU Energy Research Institute where he was director of a geothermal survey and evaluation project.

Munson graduated from NMSU in 1955 with a BSME degree and received his Masters degree in the same field from NMSU in 1962. He worked for General Electric and

Douglas Aircraft prior to working for NASA. Munson joined NASA in 1964 with engineering responsibilities on the Little Joe II Project.

In 1967, he began working at the NASA White Sands Test Facility and recently had been involved in areas of long range planning, budgeting, and management. At the time of his death, he was Technical Assistant to the Manager, WSTF.

The Munsons are survived by their four children and by his father, Dr. J. B. Munson, and one brother, John.

A memorial scholarship fund has been established by NMSU in memory of Bob and Diana in the fields of engineering and biology. Contributions should be sent to: NMSU Foundation, Munson Memorial Scholarship Fund, Box 3590, Las Cruces, New Mexico 88001



MEN'S SOFTBALL CHAMPS — Critelli Blazers won a double-header to take the Men's "A" League softball championship. Pictured from left to right are teammates Ron Epps, Dan McFarlin, Mel Richmond, Bailey Corbett, Robert Preston, Bill Jackson, Terry Neal, and Ron Staley. Not pictured are Mike Collins, Jim Pawlowski, Jack Knight, Nick Lance, and Mike Harrison.

## JSC "Angels" swing way to victory

Women's Softball at JSC is in full swing with six teams. Heading the list is the Charlie's Angels team, which wound up first place in the standings for the second season in a row with a 7-0 undefeated average.

The women play three seasons of seven games each that run from May to October every year. All NASA employees, dependents, and contractors are eligible to participate, and anybody can come out to watch. This year, the players will meet every Wednesday night at the Gilruth Recreation Center, and games will begin at 5:30 p.m.

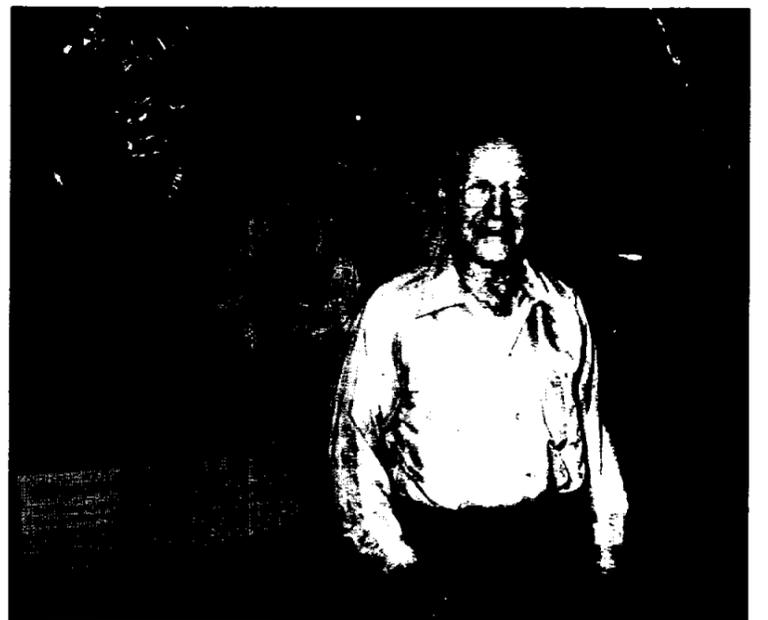
The Angels team is two years old and is composed of NASA employees, wives, and contractor personnel. Other teams include: We're Good, Wysiwyg, Hot Stuff, McAttack, and Clippers. Interested individuals should contact Charlie, of course; that is, Carlton (Charlie) Price at X-4593.

Shown in photo (right) are: Jeanie Grandell, Martha Alford, Chris Jackson, Natalie Felan, Diane Berry, Becky Beauchamp, Tonie Scott, JoAnn Birchett, Jenny Scrivner, Phyllis Middleton, Beth Gailey, Vicki Lovegren,

Pat von Dreele, Janet Ross, Charlie Price, Bill Sebastian, and Cheryl Dashiell.



Angels softball team



SENIOR CITIZEN TAKES A CLOSER LOOK — George C. Parker, age 90, couldn't get over the large size of the lunar module. "He just didn't realize it was so big," declares great-grandson G. Harold Parker, Support Branch chief, Institutional Resources Division. The senior Parker is a farmer from Purcell, Oklahoma.

## ROUNDUP

NASA LYNDON B. JOHNSON SPACE CENTER

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Editor: Beverly Eakman

Photographer: A. "Pat" Patnesky

# EAA ATTRACTIONS

## TICKETS

The following tickets are available at the Bldg. 11 Exchange Store from 10 a.m.—2 p.m. Monday — Friday.

**Astroworld** — Adult & children tickets available for \$6.95 each. That's a \$1 discount.

**Dean Goss Dinner Theater** — Comedy production, *Not with My Daughter*. Tickets \$16/couple available for any night except Monday, Saturday through Sept. 3.

**Disney Magic Kingdom Club** — Free membership cards.

**Sea-Arama Marineworld** — Tickets on sale, \$3.75 for adults, \$2.50 for children. Open until dusk, year round.

**Six Flags** — Adult & children tickets \$6.75 each. That's a \$1.20 discount.

## DEFENSIVE DRIVING

The EAA will be offering its next defensive driving course Sept. 26—29 from 6—10 p.m. at the Gilruth Recreation Center.

Registration, still a long way

off, is scheduled for Sept. 19—20 from 10:30 a.m. to 1:30 p.m. in the center lobby.

## NAUTILUS DISCOUNTS

Nautilus Health & Fitness Center has extended their offer of special membership prices through the EAA to NASA and contractor employees.

You must join by Oct. 1, 1977, to obtain the special rates. The CLC facility is located at 1120 NASA Rd. 1, Suite 100. Facilities include Nautilus equipment, sauna, whirlpool, and swimming pool.

Special rates are from \$87 to \$137 off regular rates. For more information, call Tom Gold or Drew Weiss at the CLC facility: 333-4848. Or call Ray Waldvogel at the Hyatt Regency facility: 651-1520. Membership entitles you to use any of the nine Nautilus facility locations.

## STOP SMOKING COURSE

A stop-smoking course is scheduled for Nov. 7-11. The exact

charge for the course has not yet been determined. However, due to the volume of the telephone calls on the subject, interested parties are urged to dial X-2301. A recorder will take your name and extension, and someone will call you as soon as possible. Those who have participated in the course before and have started smoking again may retake the course at no charge.

## DANCE CLASSES

The JSC Dance Club will sponsor a 10-week series of classes every Wednesday evening beginning Sept. 7 at the Gilruth Recreation Center. All types of dancing (Latin, waltz, rock, polka, fox trot, etc.) will be taught by instructors Bob and Rae Calvert of Calvert Dance Studios. Cost is \$38 per couple for the session. To register, call Dance Club secretary Billie Fairfax, X-3050.

## ATHLETIC RESERVATIONS

For any type of athletic reservations, employees should call Tim Kincaid at X-3594 after 3 p.m.

# CPS course is sponsored

The NASA Clear Lake Chapter of The National Secretaries Association (International) in conjunction with the University of Houston at Clear Lake City will again sponsor a CPS (Certified Professional Secretary) Review Course beginning August 31, 1977. Classes will be held each Wednesday evening from 6:15 p.m. to 9:00 p.m. in the Bayou Building at the UHCLC campus.

The registration fee of \$60 includes 15 nights of instruction plus handout material and parking. Registration is now being accepted; for further information, please call Mrs. Helen Cooper, CPS, 488-5806, after 6:00 p.m. Preregistration is encouraged as enrollment is limited.

kraut; Chili & Macaroni w/salad (Special); Ranch Style Beans; English Peas; Mustard Greens. Selection of Salads, Sandwiches, & Pies Daily.

**TUESDAY:** Split Pea Soup; Meatballs & Spaghetti; Liver w/onions; Baked Ham; Corn Beef Hash (Special); Buttered Cabbage; Cream Style Corn; Italian Vegetables.

**WEDNESDAY:** Seafood Gumbo; Cheese Enchiladas; Roast Pork w/dressing; Oven Crisp Flounder; BBQ Beef Plate; BBQ Link (Special); Pinto Beans; Spanish Rice; Turnip Greens.

**THURSDAY:** Beef & Barley Soup; Roast Beef w/dressing; Baked Flounder; Lasagna w/meat; Chicken Fried Steak (Special); Peas & Carrots; Buttered Squash.

**FRIDAY:** Seafood Gumbo; Fried Shrimp; Broiled Halibut; Beef Stroganoff w/noodles; Fried Chicken (Special); Breaded Okra; Buttered Broccoli; Carrots in Cream Sauce.

# 59 scientists are selected for second Spacelab flight

Fifty-nine scientists have been selected to participate in the second Spacelab flight scheduled to be launched into Earth orbit aboard the Space Shuttle in 1981.

Forty-seven of the scientists will represent the United States and 12 the United Kingdom.

The group was chosen by NASA from more than 1,000 candidates who responded to invitations to participate in the mission.

The primary objective of the second Spacelab flight is to verify the performance of Spacelab systems and subsystems and to measure the environment surrounding the Space Shuttle.

The secondary objective is to obtain scientific, applications, and technology data and to demonstrate the broad capability of Spacelab to perform space research. Astronomy, high-energy astrophysics, and solar physics research will be emphasized on this flight. Experiments will also be performed in plasma physics, botany, and medicine.

Spacelab 2 will consist of four 3-meter (10-foot) pallet segments exposed to space in the Orbiter cargo bay. In addition to serving as a mounting platform for the experiment instrumentation, the pallets will provide power, thermal conditioning, data, and other services to the instruments.

Spacelab 2 will be launched from the Kennedy Space Center,

Fla., and will remain in the Shuttle Orbiter cargo bay as it orbits the Earth for up to 11 days at an altitude of about 400 kilometers (250 miles) with an inclination of 57 degrees.

After the Space Shuttle Orbiter reaches its proper orbit, the necessary Spacelab systems will be activated and tested for proper operations. Then the scientists aboard the spacecraft (called payload specialists), working with the Orbiter crew and the scientific and technical investigators on the ground, will perform various experiments until shortly before the Spacelab systems are shut down in preparation for returning to the landing site. The two payload specialists, operating from the Orbiter aft flight deck, will work complementary shifts so that scientific experimentation can continue 24 hours a day.

The experiment complement is expected to provide new scientific results in a number of areas. In astrophysics, information will be obtained on technical composition of very high energy cosmic rays, on the spatial distribution of X-ray emitting material in clusters of galaxies, on the existence of diffuse, cool objects in our own galaxy, on the abundance of helium in the Sun and on the time evolution of small scale solar features and the possible

(Continued on page 4)

# Free flight is delayed

The second free flight of the Orbiter has been delayed until at least Sept. 7 due to heavy rains at Edwards, Calif., and the resultant soaking of the dry lakebed runway.

Astronauts Joe Engel and Richard Truly are to be the Orbiter pilots this flight.

The purposes of the second free flight are to see how the *Enterprise* responds to specific defined inputs and to test aerodynamic capabilities. The first flight tested basic handling characteristics. Again, the Orbiter will be in free flight for approximately five minutes.

## WEEK OF SEPT 5 - 9

**MONDAY:** CLOSED — LABOR DAY

**TUESDAY:** Cream of Celery Soup; Turkey A La King; Frito Pie; Pork Chop and Apple Sauce; Chinese Pepper Steak (Special); Spinach; Buttered Squash; Au Gratin Potatoes. Selection of Salads, Sandwiches, & Pies Daily.

**WEDNESDAY:** Cream of Potato Soup; Catfish w/hush puppies; BBQ Plate; Braised Beef Ribs; Mexican Dinner (Special); Broccoli; Peas; Ranch Beans.

**THURSDAY:** Vegetable Soup; Corned Beef & Cabbage; Chicken & Dumplings; Tamales w/chili; Hamburger Steak (Special); Green Beans; Cabbage; Navy Beans.

**FRIDAY:** Deviled Crabs; Liver w/onions; Halibut w/lemon sauce; BBQ Smoked Link (Special); Corn; Italian Green Beans.

## WEEK OF SEPT 12 - 16

**MONDAY:** French Onion Soup; BBQ Beef; Parmesan Steak; Spare Ribs w/

## CARS & TRUCKS

76 Corvette. T-top, auto, A/C, pwr, AM-FM stereo, custom upholstery, radials. 17K miles. Burgundy, \$7,700. 488-6957

71 Ford, Ltd. Reasonable 944-7768. 71 Buick Electra, Ltd. All pwr A/C, AM-FM, fine cond \$1,195. 482-1635.

73 Honda. 350 Four luggage rack, 2 into 1 exhaust, runs xint. \$650. Park, X-5039 or 481-2331.

75 Fiat Sports Spider convertible. Blue, 5-speed, AM-FM. \$3,100. Wilson, X-3254 or 488-4139.

74 Honda 100 SL. Xint cond. 800 actual miles. Sands, X-4878 or 332-4692 evenings.

75 Pontiac Bonneville Low mileage, xint cond 488-2345 after 5 p.m.

76 Granada. Std trans, A/C, AM-FM, radial tires. \$3,300. Handley, X-2271 or 482-7041.

74 Plymouth Custom Satellite wgn, A/C, auto pwr good cond. \$2,300. Morris, X-4823 or 1-259-0108.

72 Monte Carlo. 2-dr HT, 350, auto, pwr, A/C, stereo tape, special instr, recent tuneup, xint cond. \$1800. Shinkle, 334-3447.

68 Camaro. 327, auto, A/C, bukt seats, special instr, needs some body work. \$800. Shinkle, 334-3447.

72 Pontiac Grandville. 4-dr HT, original owner, completely loaded, steel radials, wife's car. Blue book \$2,200. Will sell \$1,700. Sterling, X-4524 or 488-1380.

## STEREOS & CAMERAS

Speakers: 8 ohm, full range, several sets (some used). Guaranteed. Best offer. Eggleston, 482-4239.

Swap Shop advertising is open to JSC federal and on-site contractor employees. Goods or services must be offered as advertised, without regard to race, religion, sex or national origin. Non-commercial personal ads should be 20 words or less, and include home telephone number. Typed or scribbled ad copy must be received by AP3/Roundup by Wednesday of the week prior to publication.

## CYCLES

Harley-Davidson sportster. Fully custom assembled, 1976. Paint by Milburn. 3,500 miles. \$2,500 or offer. Wilmeth, X-4328 or 925-5891.

75 Yamaha DT100. Street legal, luggage rack, never ridden off road, bought new in 76, perfect cond. 2600 miles. \$375. Mobley, X-4428 or 334-5201 after 5.

## BOATS

12-ft. alum DW Quachita. 9.5 HP, Johnson Trol mtr, trailer. Run, Lts. Cornelius, X-5441 or 422-3394 (Baytown).

## PROPERTY & RENTALS

Lake Livingston lots below 1972 cost. Tex Ward, X-2386 or 488-5445.

Islander East Condo. Top floor efficiency unit. Xint Gulf view, balcony, tennis, beach, swimming pool. Furnished. 481-3397 after 6 p.m.

Vacation retreat for rent at Cape Royale on Lake Livingston. Tennis, pool, boat launch, golf, 3-day minimum. 588-3746.

For rent: Lake Livingston, Cape Royale, compl furn home, 3—2—1. Fishing, hunting, tennis, golf, etc. Reserve early, wk/mo/yr rates. 488-4487.

Lease: 3—2—2 CLC. \$350/mo, 1st, last, & deposit. No pets. 488-7032.

Rent: 4-bdrm house. 2 bath, 2-car garage, accessible to all CLC schools.

\$500/mo. Call Clare, 334-5038 or 334-1271 weekends.

Rent: Reserve for summer vacation now. Jamaica Beach house, Galveston. New 2-story. \$175/wk. 334-1640 after 5 p.m.

Two rooms to let for 1 or 2 semesters. Family environment; father & 14-year-old daughter. Laundry/kitchen privileges. Large house. Perfer non-smoker, female. \$85/mo. Juday, X-4505 or 481-3946.

## PETS

4 Kittens need homes: 2 male, 2 female, 8 wks. Lauhon, X-2151 or 554-6478.

Shetland sheepdog, AKC. Female, 6 mos. \$150. Morris, X-4823 or 1-259-0108.

## HOUSEHOLD ARTICLES

Refrigerator: large Whirlpool frost-free, 13 cu ft/freezer, 3 cu ft. \$75, 488-0406 after 5 p.m.

Avacado green decorator panels for complete set of Frigidaire kitchen appliances. Xint cond. Prince, X-5234 or 474-5702.

Double bed, child's dresser, end table, chair, lamp, concrete blocks w/shelves. All for \$65. Erick, X-4551.

Two solid oak twin beds (frames & headboards, no mattresses). \$20 each. Williams, 482-6027

Zenith 19-inch color TV. 1972

model, good cond. \$90. Williams, 482-6027.

## WANTED

Quiet female roommate to share 2-bdrm apt w/female grad student. 334-2331 or 488-3433.

Ride from Dickinson High School to NASA at noon and to San Leon evenings. X-3655 or 339-2357.

Male roommate to share 2 bdrm apt w/same. NASA area. Must be trustworthy and neat. Cox, X-2033.

Carpool from Forest Bend. Join or form, 8-5. Carol, X-3116 or 482-0935.

Need riders for carpool from W Loop, SW Fwy. Bellaire area, 8—4:30. McLaughlin, X-5536 or 661-2974.

Firefighters needed! Men and women adult residents of CLC needed to join CLC Volunteer Fire Dept. Rewarding community service. You will be trained and equipped. Call 488-0023 any time.

## MUSICAL INSTRUMENTS

Normandy clarinet. Needs new pads, otherwise xint cond. \$30. Edi, X-2076 or 334-5170 after 5 p.m.

Bach Signet trumpet. Silver finish, xint cond, school approved. \$200. Also Conn Director coronet. Good beginners instrument. Fair cond. \$50. 482-7734 after 5:30 p.m.

71 4-valve King Baritone horn & case. Xint cond, school approved. Will sacrifice. 482-7990.

## LOST & FOUND

Metal-framed eyeglasses lost in parking lot by Bldg. 35 or on back road out to CLC. Williams. X-6226.

One gray sweater from 2nd floor MOCR PAO console. It helped fly Sky-lab and ASTP. Winston, X-4231.

## MISCELLANEOUS

Front wheel drive hubs for Scout & Jeep CJ series. \$10. 488-0406 after 5 p.m.

Regulated DC power supply: 6, 12, 24, 48, 140 VDC out; 110 or 220 VAC in. Call for details. \$60. Samouche, 488-0406 after 5 p.m.

Quality homebuilt watertight car-top carrier box (48" x 60" x 18"). \$40 or best offer. Garcia, 333-4880 or 333-2916 (day).

Stock 14" rims, whl covers from 76 Datsun 280Z's. Fits all Z's. 1 set new, \$100. 1 set 1 yr old, \$75. Moon, X-4405 or 485-5184.

Fresh honey. \$.25/oz., \$.9/gal. Ward, X-4976.

74 4-wheel electric golf cart. Fiberglass body, hardtop, lights, safety glass, xint cond. Orig. \$1,935. Will sell cheap. Thompson, X-5441 or 649-1714.

New & used Honda CL 175 and CB 100 1971 misc parts. Smith, X-4468 or 488-3238.

75 22" Cobra-Quality mini motor-home. Xint cond, loaded, financed w/JSC Credit Union. No equity. 488-3170 or 488-3377 after 5 p.m.

6-ft. padded bar & 3 bar stools. \$150. 474-5933 after 5:30 p.m.

## Astronaut applicants include 8 women

The third group of 20 Space Shuttle astronaut applicants selected for interviews and physical examinations are all in the Mission Specialist category. They reported to JSC Aug. 29.

Eight of the 20 astronaut applicants in this group are women. All 20 in this group have Ph. D. or medical degrees or both, and one has a degree in veterinary medicine.

Approximately 200 of the 8,079 who applied for the astronaut program will be coming to JSC for further screening. The selection process is scheduled to be completed in mid-November.

The astronaut candidates selected for the two-year evaluation period before final selection as an astronaut will be notified in December. As many as 20 astronaut candidates will be named in each of the two categories — pilot and mission specialist.

The names; sex; male (M), female (F); age; military rank and or degree(s); birthplaces (BP); and current duty stations (DS) of these 20 applicants are:

James P. Bagian, (M), 25, M.D.; BP — Philadelphia, Pa.; DS — Naval Air Test Center, Patuxent River, Md.

Stephen C. Boone, (M), 39, M.D. Ph. D.; BP — Navasota, Tex.; DS — Walter Reed Army Medical Center, Washington, D.C.

Nitza M. Cintron, (F), 27, Ph. D.; BP — San Juan, Puerto Rico; DS — Johns Hopkins University School of Medicine, Baltimore, Md.

Mark S. Davis, (M), 33, Lt. USN, M.D.; BP — Philadelphia, Pa.; DS — Naval Regional Medical Center, Oakland, Calif.

Danielle J. Goldwater, (F), 29, M.D.; BP — West Haven, Conn.; DS — Stanford Hospital, Stanford University, Calif.

Lionel O. Greene, Jr. (M), 29, Ph. D.; BP — Brooklyn, N.Y.; DS — NASA Ames Research Center, Moffett Field, Calif.

Dale A. Harris, (M), 31, Ph. D.; BP — Amarillo, Tex.; DS — Letterman Army Institute of Research, Presidio of San Francisco, Calif.

James R. Hickman, (M), 35, Lt. Col. USAF, M.D.; BP — Elkhorn City, Ky.; DS — USAF School of Aerospace Medicine, Brooks AFB, Tex.

Michael P. Hlastala, (M), 33, Ph. D.; BP — Uniontown, Pa.; DS — University of Washington, Seattle, Wash.

Harry P. Hoffman, (M), 34, Lt. Cmdr. USN, M.D.; BP — New Bern, N.C.; DS — Air Test and Evaluation Squadron 4, NAS Pt. Mugu, Calif.

Bruce A. Houtchens, (M), 39, M.D.; BP — Olympia, Wash.; DS — University of Utah, Salt Lake City, Utah.

Michael D. Castello, (M), 32, Capt. U.S. Army, Ph. D., DVM; DP — LaSalle, Ill.; DS — U.S. Army Medical Institute of Infectious Disease, Frederick, Md.

Wayne F. Kendall, (M), 39, Major USAF, M.D.; BP — Harrison, Ark.; DS — Wright-Patterson Aerospace Medical Research Laboratory, Ohio.

Shannon W. Lucid, (F), 34, Ph. D.; BP — Shanghai, China; DS — Oklahoma Medical Research Foundation, Oklahoma City, Okla.

B. Tracey Sauerland, (F), 29, M.D.; Ph. D.; BP — New Britain, Conn.; DS — JSC Space and Life Sciences Directorate, Houston, Tex.

Margaret R. Seddon, (F), 29, M.D.; BP — Murfreesboro, Tenn.; DS — City of Memphis Hospital, Memphis, Tenn.

Anna L. Sims, (F), 28, M.D.; BP — Albany, N.Y.; DS — Harbor General Hospital, Torrance, Calif.

Stephen C. Textor, (M), 29, M.D.; BP — Denver, Colo.; DS — Boston University Hospital, Boston, Mass.

Victoria M. Voge, (F), 34, Lt. Cmdr. USN, M.D.; BP — Minneapolis, Minn.; DS — Naval Aerospace Medical Institute, Pensacola, Fla.

Millie H. Wiley, (F), 31, Ph. D.; BP — Mineral Wells, Tex.; DS — Veterans Administration Hospital, San Francisco, Calif.

## Launches...

(Continued from page 1)

Canaveral, and launch occurred at 2:29 a.m. as planned.

Launch was aboard an Atlas-Centaur rocket from Cape Canaveral, and the launch window extended from 1:35 to 2:42 a.m. EDT.

The Aug. 17 launch of the Italian communications satellite, SIRIO, was to occur between 7:50 and 9:00 p.m. EDT at the Cape.

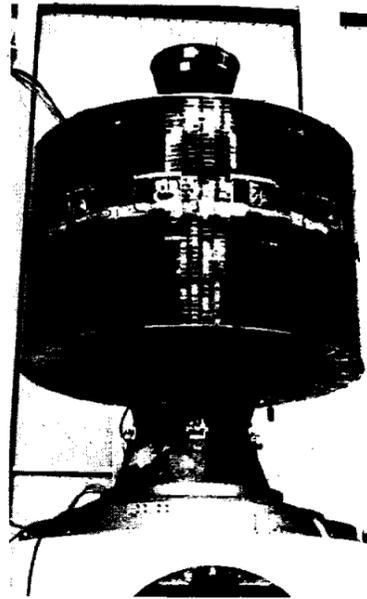
However, a problem with the third Delta stage separation system caused the launch to be delayed until Aug. 25.

The satellite, in synchronous orbit over the Equator just south of the west coast of Africa, will carry out various scientific experiments in telecommunications.

The principal experiment of

SIRIO is to study the propagation characteristics of radio waves transmitted at super high frequencies (SHF) during adverse weather conditions.

From its initial on-station position, SIRIO will transmit voice, data, and television picture in the SHF range from Europe to North America. The use of SHF frequencies is becoming necessary due to overcrowding of conventional frequency bands.



SIRIO COMMUNICATIONS SATELLITE — An entire segment of Italian industry worked on this spacecraft and is expected to use the acquired experience in future international space programs. SIRIO is Italian for Sirius, the dog star, and also the Italian acronym for "industrial research-oriented Italian satellite."

## 59 scientists...

(Continued from page 3)

relation between changes in solar velocity and magnetic fields.

The principal investigators and their research areas are as follows:

Dr. Alan Gabriel, Appleton Laboratory, Abingdon, Oxfordshire, United Kingdom, Solar Coronal Helium Abundance.

Dr. Guenter Brueckner, U.S. Naval Research Laboratory, Washington, D.C., Solar Ultraviolet High-Resolution Spectroscopy.

Dr. Alan M. Title, Lockheed Solar Observatory, Palo Alto, Calif., Solar Magnetic and Velocity Field Measurements.

Dr. Peter Meyer, University of Chicago, Studies of Cosmic Ray Nuclei.

Dr. Michael Mendillo, Boston University and Dr. Aldo da Rosa, Stanford University, Palo Alto, Calif., Ionospheric Plasma Depletion Experiments.

Dr. Stanley Shawhan, University of Iowa, Plasma Diagnostics from an Ejected Subsatellite.

Dr. Giovanni Fazio, Smithsonian Astrophysical Observatory, Cambridge, Mass., Infrared Astronomy With a Helium-Cooled Telescope.

Professor Peter Willmore, University of Birmingham, United Kingdom, X-ray Imaging of Extended X-ray Sources.

Dr. Heinrich Schnoes, University of Wisconsin, Vitamin D Metabolism of Flight Crew Members.

Dr. Joe Cowles, University of Houston, Plant Lignification Studies.

## Outer space connections: They're not science-fiction anymore

Several important steps have been taken toward placing huge powerplants, factories, and, perhaps, even entire cities into outer space.

One of these steps has been the contract recently awarded to the Lockheed Missiles and Space Company in Sunnyvale, Calif., by the NASA Langley Research Center in Hampton, Va. Under this contract, Lockheed is to develop basic concepts for building large space structures.

The effort will focus on new technology for strong, lightweight components such as joints and columns and on the development of innovative construction methods. Lockheed will then build prototypes of the new components for testing and evaluation at Langley.

Robert R. Johnson, who will manage the program for Lockheed, points out the growing support for construction of large structures in

space, such as power stations that would send energy back to Earth in the form of microwaves. Such stations would be massive and consist of several square miles of solar cells.

The Marshall Space Flight Center has fabricated a space vehicle for testing space construction operations called the "Free Flyer." It is propelled through 40-foot-deep water by small electric trolling motors simulating thrusters that would be used in space. A prefabricated construction beam can be maneuvered by an operator in much the same way an astronaut in a space suit would maneuver in space. The Free Flyer is capable of moving through water in any direction.

The weightless environment of space is also considered an ideal setting for the manufacture of certain specialized products, such as perfect crystals for electronic components, that cannot be made prop-

erly under the gravity conditions of Earth-based factories. Additionally, space-based antennas could be a boon to terrestrial or interstellar communications and to radio astronomy.

Many scientists believe that much of the raw material needed for space construction could be taken from the Moon or asteroids. One proponent for the concept is Dr. Gerard O'Neill of Princeton University, who has worked tirelessly for some time to gain support for long-range plans to develop space technology and exploit the space frontier for the benefit of man.

Dr. O'Neill directed this year's summer study at the Ames Research Center. The workshop has become an annual event in recent years and concerns space manufacturing and space settlements. Once viewed as very futuristic and even far-fetched by some, the 1977 NASA-Ames Summer Study was considered the largest yet conducted on these topics, and more than 50 people, representing universities, Government, and private industry, participated.

Five study teams addressed the following technical areas: the development of long-range plans for the ultimate design of closed or partly closed life support systems; a cost and design sensitivity study on habitats of varying sizes taking into account human physiological requirements; minimum-investment, maximum-payback construction plans for space manufacturing; engineering of mass-drivers for the transport of lunar materials into space, of payloads from Earth to



MASS DRIVER — The 32-foot-long demonstration model of a mass-driver.

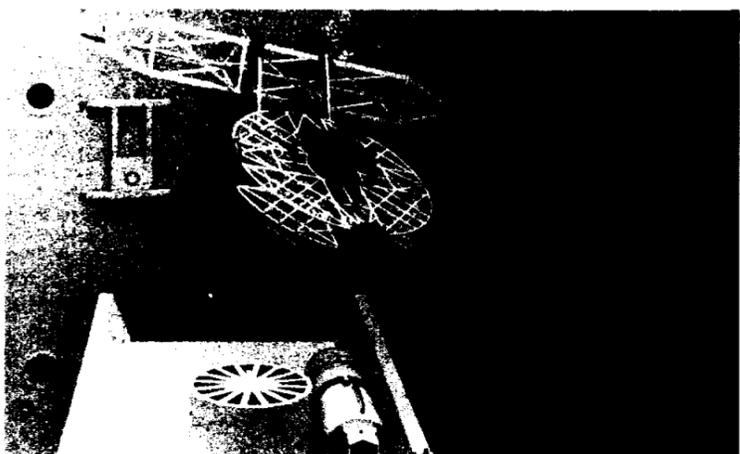
lunar orbit, and for retrieval of asteroids; detection, orbital characteristics, and retrieval scenarios for Earth-crossing asteroids; and the processing of lunar or asteroidal material into useful products for the construction of large space structures.

Although not specifically addressed in this study because the subject has been covered in other NASA studies, the production of satellite solar power stations to send clean energy to Earth within the next two decades was a goal of the Ames Summer Study. Instead, the 1977 Summer Study explored ways to use the Space Shuttle system, beginning in the 1980's, to set up a small mining and transport base on the Moon surface to ship materials out to a precise point in space.

Essential to Dr. O'Neill's in-space construction concept is the brainstorm called the mass-driver, which was demonstrated in the

parking lot at Ames. According to the group, "the mass-driver is an electrically powered machine which accelerates materials to high speed and sends them out in a precise direction." It consists of a long "guideway" made of aluminum strips, wound with coils. A small vehicle with no moving parts called a "bucket" floats along the guideway by magnetic forces, using principles known for the past 60 years. The bucket accelerates to high speed, is pushed by magnetic forces, releases its payload, and returns for reuse.

On each six-month round trip, the mass-driver would carry about 700 tons of payload and would obtain its thrust by expelling at high speed small pellets made from the Shuttle external tanks. The group calculated that within the limits of existing materials, mass-drivers can be built with performance more than twice as high as the best chemical rocket.



FREE FLYER — An operator hovers over a mockup of the Space Shuttle cargo bay in a demonstration of the Free Flyer, a simulated space vehicle fabricated for testing space construction operations. The tests take place in a simulated weightless environment of the Neutral Buoyancy Simulator at the Marshall Space Flight Center.